

Cubesat Collapsible Composite Antenna, Phase I

Completed Technology Project (2015 - 2015)



Project Introduction

GATR proposes a large aperture reflector antenna for CubeSats that is stored by collapsing, folding, or rolling. When deployed, the flexible composite reflector snaps back into the precision parabolic shape to provide communication. Decades of research have made GATR Technologies expert in the engineering of large membrane concentrator systems. Its ground-based antennas are already revolutionizing portability in satellite communications. Innovation is required only to leverage this reflector expertise into a unique concentrator system adapted for CubeSat platforms and the orbiting space environment. The work of this SBIR will specifically address solutions to the stowing, deployment, and environmental design challenges of producing an antenna module for CubeSats. To that end, GATR will be teaming with the COSMIAC Research Center at the University of New Mexico. COSMIAC has extensive spaceflight research and design experience. Its flight heritage includes successful missions currently in orbit. GATR's designs yield flexible parabolic reflectors that perform equivalently to rigid parabolic reflectors. The CubeSats equipped with large aperture antennas will transmit highly focused signal with increased link gain without drawing additional power from the spacecraft bus. This gain is especially noteworthy compared to the performance of the small patch antennas currently employed on CubeSats. A large aperture parabolic dish will significantly improve transmission data rates for communication applications or improve spatial resolution for radiometry applications. This SBIR will conclude with a demonstration of both the flexible antenna and a prototype deployment mechanism. The demonstration will be planned to highlight the function and performance that will eventually come to define a common CubeSat high gain antenna module. The design and testing that constitute the work of this SBIR will be conducted to achieve success in this singular objective.



Cubesat Collapsible Composite
Antenna, Phase I

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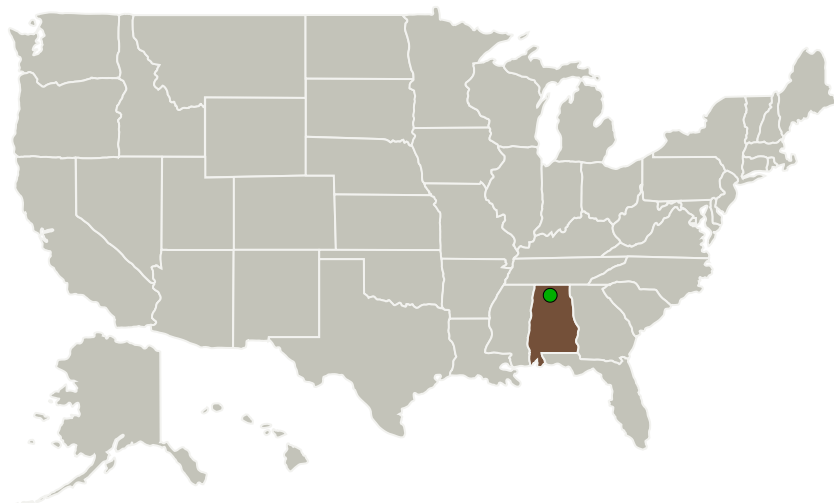
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
GATR Technologies	Lead Organization	Industry	Huntsville, Alabama
● Marshall Space Flight Center (MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations

Alabama

Project Transitions

▶ **June 2015:** Project Start

✓ **December 2015:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138912>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

GATR Technologies

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

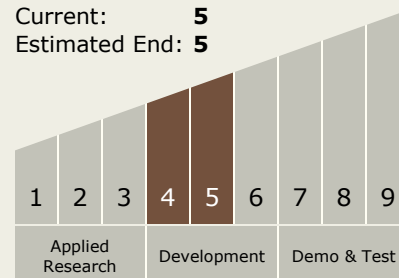
Carlos Torrez

Principal Investigator:

Larry Lowe

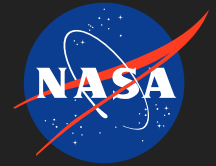
Technology Maturity (TRL)

Start: 4
Current: 5
Estimated End: 5

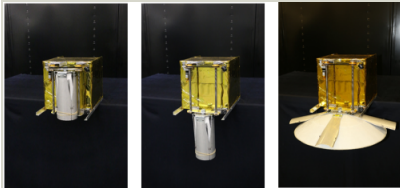


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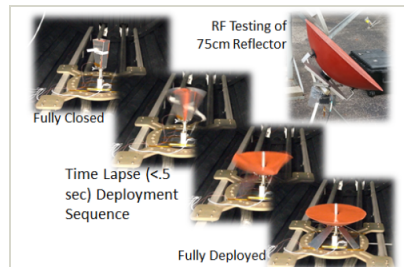


Images



Briefing Chart

Cubesat Collapsible Composite Antenna Briefing Chart
(<https://techport.nasa.gov/image/128399>)



Final Summary Chart Image

Cubesat Collapsible Composite Antenna, Phase I Project Image
(<https://techport.nasa.gov/image/127492>)

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.2 Radio Frequency
 - └ TX05.2.6 Innovative Antennas

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System